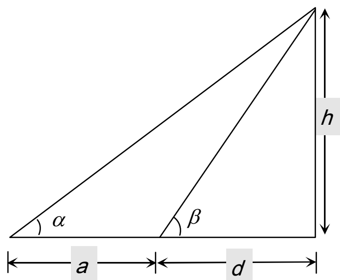
Some Important Results.

(1)

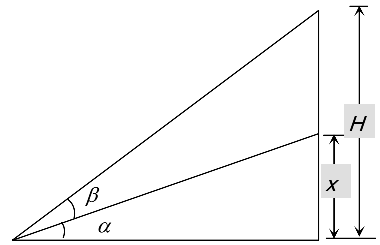


$a = h(\cot\alpha - \cot\beta) = \dfrac{h\sin(\beta-\alpha)}{\sin\alpha.\sin\beta}$

$\therefore h = a\sin\alpha\sin\beta\,cosec\,(\beta-\alpha)$ and

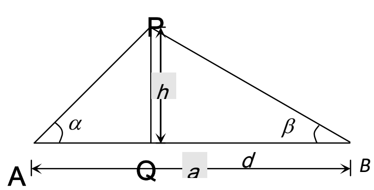
$d = h\cot\beta = a\sin\alpha.\cos\beta.\text{cosec}\,(\beta-\alpha)$

(2)



$H = x\cot\alpha\tan(\alpha+\beta)$

(3)

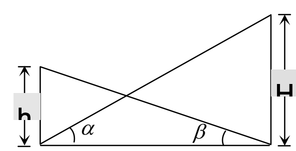


$a = h(\cot\alpha + \cot\beta)$, where by

$h = a\sin\alpha.\sin\beta.\text{cosec}\,(\alpha+\beta)$ and

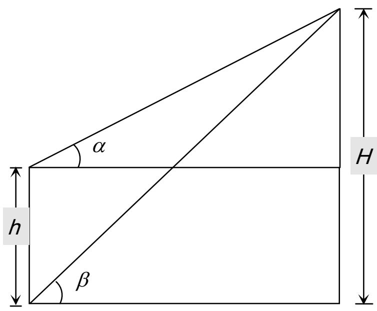
$d = h\cot\beta = a\sin\alpha.\cos\beta.\text{cosec}\,(\alpha+\beta)$

(4)



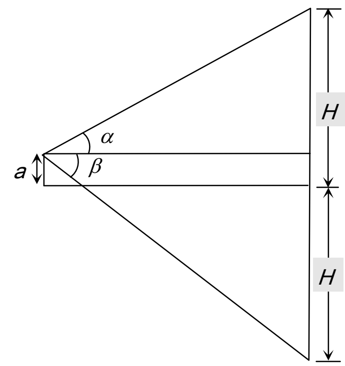
$H = \dfrac{h\cot\beta}{\cot\alpha}$

(5)



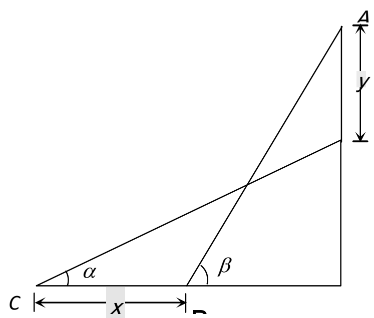
$h = \dfrac{H \sin(\beta - \alpha)}{\cos\alpha \sin\beta}$ or $H = \dfrac{h \cot\alpha}{\cot\alpha - \cot\beta}$

(6)



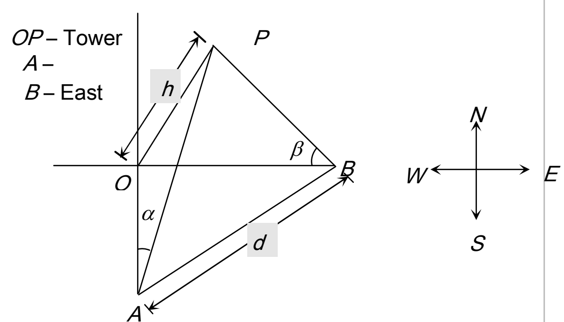
$H = \dfrac{a \sin(\alpha + \beta)}{\sin(\beta - \alpha)}$

(7)



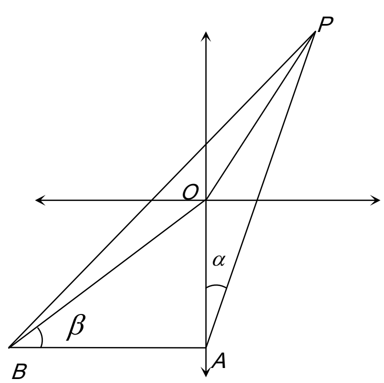
$AB = CD$. Then, $x = y \tan\left(\dfrac{\alpha + \beta}{2}\right)$

(8)



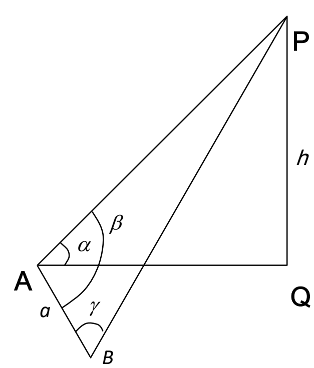
$h = \dfrac{d}{\sqrt{\cot^2\beta + \cot^2\alpha}}$

(9)



$h = \dfrac{AB}{\sqrt{\cot^2\beta - \cot^2\alpha}}$

(10)



$h = AP \sin\alpha = a \sin\alpha . \sin\gamma . \text{cosec}\ (\beta - \gamma)$ and

if $AQ = d$, then

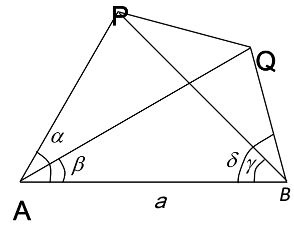
$d = AP \cos\alpha = a \cos\alpha . \sin\gamma . \text{cosec}(\beta - \gamma)$

(11) $AP = a\sin\gamma.\text{cosec}(\alpha-\gamma)$

$AQ = a\sin\delta.\text{cosec}(\beta-\delta)$

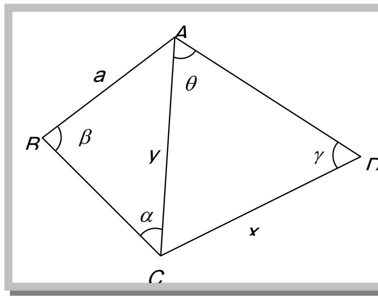
and apply,

$PQ^2 = AP^2 + AQ^2 - 2AP.AQ\cos\theta$



Important Tips

☞ In the application of sine rule, the following point be noted. We are given one side a and some other side x is to be found. Both these are in different triangles. We choose a common side y of these triangles. Then apply sine rule for a and y in one triangle and for x and y for the other triangle and eliminate y. Thus, we will get unknown side x in terms of a. In the adjoining figure a is known side of Δ ABC and x is unknown is side of triangle ACD. The common side of these triangle is AC = y (say) Now apply sine rule



$\therefore \quad \frac{a}{\sin\alpha} = \frac{y}{\sin\beta}$ .... (i) and $\frac{x}{\sin\theta} = \frac{y}{\sin\gamma}$ ....(ii)

Dividing (ii) by (i) we get, $\frac{x\sin\alpha}{a\sin\theta} = \frac{\sin\beta}{\sin\gamma}$; $\therefore \quad x = \frac{a\sin\beta\sin\theta}{\sin\alpha\sin\gamma}$